Accessing Artificial Intelligence for Clinical Decision-Making

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Abstract

Advancements in computing and data from the near universal acceptance and implementation of electronic health records has been formative for the growth of personalized, automated, and immediate patient care models that were not previously possible. Artificial intelligence (AI) and its subfields of machine learning, reinforcement learning, and deep learning are well-suited to deal with such data. The authors in this paper review current applications of AI in clinical medicine and discuss the most likely future contributions that AI will provide to the healthcare industry. For instance, in response to the need to risk stratify patients, appropriately cultivated and curated data can assist decision-makers in stratifying preoperative patients into risk categories, as well as categorizing the severity of ailments and health for non-operative patients admitted to hospitals. Previous overt, traditional vital signs and laboratory values that are used to signal alarms for an acutely decompensating patient may be replaced by continuously monitoring and updating AI tools that can pick up early imperceptible patterns predicting subtle health deterioration. Furthermore, AI may help overcome challenges with multiple outcome optimization limitations or sequential decision-making protocols that limit individualized patient care. Despite these tremendously helpful advancements, the data sets that AI models train on and develop have the potential for misapplication and thereby create concerns for application bias. Subsequently, the mechanisms governing this disruptive innovation must be understood by clinical decision-makers to prevent unnecessary harm. This need will force physicians to change their educational infrastructure to facilitate understanding AI platforms, modeling, and limitations to best acclimate practice in the age of AI. By performing a thorough narrative review, this paper examines these specific AI applications, limitations, and requisites while reviewing a few examples of major data sets that are being cultivated and curated in the US.